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Industrial Selling as a Profession

A REMARK was made in the "Notes and Comments" of THE CHEMICAL AGE a short time ago about a chemist who had unsuccessfully turned salesman. That example prompted the reflection how often the salesman is looked down upon as an unskilled pedlar performing a not too necessary task that anyone with average common sense can do. The salesman, in short, is often regarded as an inferior member of the staff by the technical men, and not infrequently chemists and engineers out of a job will at once turn their attention to selling as a means of livelihood until they can find once more a niche in their chosen profession.

The facts are quite otherwise. It may be that the door-to-door salesman often does not appear to be possessed of high intelligence. He has to repeat his story quickly before the door is closed upon him, and he has been told what to say in advance by the sales manager. In the chemical profession there are laboratory assistants, and there are research chemists; in the business of selling there are the door-to-door salesman, and there are the industrial experts. In industry, not infrequently the head of a business does the bulk of the selling. That is so, for example, in those businesses that design, construct and erect great industrial plants. To sell such a plant requires high technical knowledge, a flair for skilful presentation of a case, knowledge of the psychology of the buyer, and infinite tact and perseverance. Selling is not a function that can be lightly delegated. Quite frequently the finest technical men and chemists are the worst salesmen because their mental outlook is different from that required for success in this sphere. The importance of the salesman cannot be over-estimated. A plant may be sold costing tens of thousands of pounds. It will keep a works, and a drawing office, and sub-contractors and a large erection staff busy for months; yet in the outcome it is the salesman who has been responsible for it. He is the bottle-neck through which the prosperity of the firm must pass. The profession of salesman is therefore of fundamental importance in every branch of industry for no firm can exist, no one can be employed, nor can the chemist and the engineer perform their functions, unless the salesman has first done his work successfully.

The industrial salesman may work for months without an order of any size, and he may then get one big enough to keep him in commission for a year. The salesman, therefore, must not be easily disturbed, nor must he suffer from depression nor from undue elation. All this needs certain human qualities which not everyone possesses, but there is one fundamental quality without which the industrial salesman is severely handicapped. It is *technical knowledge*. The salesman who has been brought up with his firm and who knows their outlook and their products is of inestimable value. The technical man who can discuss intricate technical points with the buyer and his engineers will win more often than he loses. He must be able to put forward convincingly the good points of his own plant, without decrying those of his competitors. A salesman who is called in to discuss design or operation even when there is no order at stake will be the man to whom the buyer will turn when there is an order to be placed. Unquestionably, the salesman should be able to discuss the tender with the estimating or design departments before it is sent in, and in that way he will be best able to put the offer before his clients attractively. There are many industries, of course, in which standard products are sold, such as chemicals, where this prior discussion is unnecessary. But the more the seller knows about what he has to offer, the better will be his chances.

The conclusion to be drawn is that many of our young graduates might with advantage be trained for the sales staff. They should be selected on the basis of personality and general qualifications, but they should then be trained for two or three years in the works with a view to joining the sales staff. It is generally a mistake to take a man from the laboratory or drawing office and expect him to become, overnight, an expert salesman. The office mentality does not make a successful salesman. The salesman is not tied to hours, and he is free to play golf or to dine or lunch with his client as he thinks fit; but he cannot do these things successfully and bring off his deal unless he is a man of the world in the best sense of the word, and not possessed of the narrow vision that office or laboratory routine too often brings.

NO WASTE, NO DISAPPOINTMENT

BRITISH newspapers have had imposed upon them the national obligation to limit "returns" of unsold copies, with a view to their complete elimination within a few weeks time. Readers of THE CHEMICAL AGE are therefore strongly urged to become direct subscribers or to give a definite order to a newsagent or at a bookstall if they have not already taken either course. By doing so they will (a) help to conserve the supplies of paper in the country, (b) avoid unnecessary use of various means of transport, and (c) avoid the disappointment of missing their trade journal. In cases of difficulty readers should write to The Publisher, THE CHEMICAL AGE, Bouverie House, Fleet Street, London, E.C.4.

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NOTES AND COMMENTS

Magnesium Oxide in Fertilisers

THE possibilities of magnesium oxide as an ingredient of mixed fertilisers were discussed by Messrs. C. W. Whittaker, L. F. Rader, junr., and K. V. Zahn, of the Division of Fertiliser Research, Bureau of Agricultural Chemistry and Engineering, Washington, U.S.A., in a paper which they presented last month to the American Chemical Society. Active magnesium oxide, they state, is now being prepared from sea water, and it is available also in the form of selectively calcined dolomite as a source of magnesium for mixed fertilisers. Sea water magnesium oxide is more concentrated than any other magnesium carrier now on the market and offers interesting possibilities as a fertiliser material. The authors suggest that in addition to its possible use as a source of available magnesium, it may also serve as a conditioning agent for superphosphate and mixed fertilisers; a basic material for the physiological neutralisation of mixed fertilisers that are not too acid; a drying agent by reacting with the components of a fertiliser mixture to form hydrated compounds; and a means for forming water-insoluble nitrogen compounds, such as magnesium ammonium phosphate, in mixed fertilisers.

A Disadvantage

ACTIVE magnesium oxide offers the disadvantage that quantities in excess of a certain limiting percentage, which varies with the composition of the mixture with which it is included, cause loss of ammonia and reversion of phosphoric acid. No appreciable loss of ammonia nor reversion of phosphoric acid was found to occur, however, in a superphosphate, an ammoniated superphosphate and in a 6-8-6 mixed fertiliser that contained either 20 or 40 lb. of MgO per ton of superphosphate in the mixture when stored for 10 days at 30° C. Storage of the same mixtures at 60° and 90° C. caused a slight reversion of phosphoric acid but little or no loss of ammonia. When the content of magnesium oxide was increased to 80 pounds, some loss of ammonia occurred in the two mixtures containing it, but only in the ammoniated superphosphate was there any reversion of phosphoric acid. All mixtures developed heat on mixing but the heat evolved was small relative to that developed by the addition of an equivalent quantity of ammonia. X-ray analysis indicates that selectively calcined dolomite is a mixture of calcite and magnesium oxide, but attempts to separate the components of the mixtures by physical means were not successful. The magnesium oxide in this material is also reactive as shown by the development of heat and the disappearance of the water phase when a suitable quantity is added to a slurry of monoammonium phosphate.

Fruit Pectins

THE Department of Scientific and Industrial Research has issued a report of an investigation into the chemical behaviour and jellying properties of fruit pectins (H.M. Stationery Office, 1s. 6d. net). The report states that a study was made of minor chemical properties and their variations in a number of sections purified by re-solution and reprecipitation with weak alcohol or acetone. The free acidity, the *p*H of the solution, and the proportion of alkaline ash constituents varied widely, but were related in such a way as to show that the latter were derived from metallic bases united with acidic groups of the pectin. The methoxyl content of the pectins also varied widely, but must in many cases have been affected by the method of preparation. The proportion of total acidic groups, as given by the sum of the esterified, free, and neutralised groups, varied to a more limited extent. Accepting the view that the constituent units of the pectin molecule are mainly galacturonic acid, the results showed that the proportion of such units was from 75 per cent. to 95 per cent. of the whole. The irregularity of the variations suggests that the carboxyl content of a pectin is an average for a variety of differently carboxylated molecules. The ability of pectins to take up calcium from solutions of calcium salts was demonstrated, and the salts so found showed improved jellying properties. This probably applies also to other metallic salts, and it is suggested that acids (and moderate amounts of alkali) modify the strength of jelly obtainable from a pectin or pectinous solution by regulating the extent to which this interaction with metallic salts occurs. For a proper study of their jelly-forming behaviour pectins must be regarded as complex carboxylic acids of variable composition.

Chlorine Detection

THE latest of the series of pamphlets concerning methods for the detection of toxic gases in industry, published by the Department of Scientific and Industrial Research, is Leaflet No. 10, dealing with chlorine. Readers may be reminded that the leaflets already published deal with benzene, carbon bisulphide, hydrogen cyanide, hydrogen sulphide, nitrous fumes, and sulphur dioxide. As in most cases, chemical detection methods involving colour changes have been adopted as best suited for the purpose in view. The test has been carefully standardised in the laboratory and tested under practical conditions in actual works. The only known test for chlorine which is sufficiently sensitive to fulfil the necessary requirement of detecting 1 part in 1,000,000 is that depending on the interaction between chlorine and a dilute solution of *o*-tolidine to give a yellow compound, which can be estimated colorimetrically. The test papers are approximately one-tenth as sensitive to nitrous fumes as to chlorine. The test is applied by drawing samples of the air, by means of a hand pump of definite capacity, through a bubbler of *o*-tolidine solution until the depth of colour produced is equal to that of one of a series of standards prepared from potassium dichromate solution.

From the number of strokes required the concentration is then obtained by reference to a table. Detailed instructions for carrying out the test are provided by the leaflet, copies of which (price 3d. net) are obtainable from H.M. Stationery Office or their agents.

Italian Alkali Industry

IN the last ten years the Italian alkali industry has been progressing by leaps and bounds. At Rosignano, for example, the construction of a new electrolytic plant for the Società Chimica dell' Aniene has only recently been put in hand. Three-quarters of the total production of caustic alkali are absorbed by the textile industries. The amount of carbonates produced has increased five-fold since the last war, rising to four million quintals in 1937. Most of the factories have installed Kellner-Solvay mercury cells, but certain improved types have been introduced by Italian chemical engineers. In consequence of the surplus production of chlorine, various new products have been placed on the market. The Società Elettrica del Caffaro has found an outlet for its chlorine in the manufacture of insecticides with a copper oxychloride base. Iron and magnesium chlorides, chloroform, chlorinated rubber, chlornaphthalenes and chlorodiphenyls, carbon tetrachloride, and various fumigating agents are likewise being produced. The Società Pomilio, which manufactures cellulose from a basis of straw, has become a large consumer of chlorine.

Decline in World Chemical Production

A STUDY covering chemical production, trade and developments in 60 countries of the world during 1938 has been compiled by the Chemical Division of the United States Bureau of Foreign and Domestic Commerce from reports submitted by foreign commerce officers throughout the world. The study makes interesting reading. It indicates that notwithstanding the inauguration of new industries, the expansion of existing plants and intensified research, total world chemical production declined in 1938. It is considered that this was due mainly to large carry-overs from 1937 as a result of heavy purchases following the outbreak of hostilities in the Orient. In several European countries, where rearmament programmes were actively pursued, the output of the chemical and allied industries is believed to have exceeded that of 1937. This, it is stated, was particularly true in Germany where every effort was being made to develop synthetic materials. No significant changes occurred in the field of international chemical cartels, but the report points out that territorial changes which took place in Europe during the year will undoubtedly make revisions necessary.

Health of War-Time Workers

THE effects of conditions of work on the health, outlook and efficiency of workers are all too easily forgotten in times of war. An article in the October issue of *Occupational Psychology,* published by the National Institute of Industrial Psychology, is particularly important in this connection. Writing on workers and machines, Dr. Wyatt, investigator to the Industrial Health Research Board, has dealt with the significance of the speeds of machines in relation to workers, the importance of change of work and posture, hours of work, rest pauses, boredom and the dangers of "speeding up." " In almost all forms of machine-feeding and conveyor operations," he writes, "the work is simple, uniform, and continuous, and the operative is compelled to behave almost as mechanically as the machine on which he works. It is accordingly not surprising that many workers complain of boredom, fatigue and strain." Referring to the need for adjustable machines, Dr. Wyatt remarks that to ensure comfort and efficiency, the speed of the machine should be adapted as closely as possible to the natural rate of working of the operative. A certain amount of "adjustment may be secured by the selection of operatives who possess the degree of dexterity and endurance necessary for the task. As a rule, this is achieved by a process of trial and error; but this hit-or-miss method is obviously wasteful of time and effort. Psychological tests offer a more promising line of approach and the results are likely to give more satisfaction to all concerned. In this connection it is important to remember that temperamental tendencies may be quite as important as dexterity in determining suitability for work."

War-Time Accident Prevention

"EVERY person injured by industry is a loss to the nation's resources—just as he would be if injured in a militant activity," states Sir Duncan Wilson, H.M. Chief Inspector of Factories," in a message to the National "Safety First" Association, welcoming its decision to maintain its industrial accident prevention work during war time. He points out that during war time many new factors tend to increase the chances of factory accidents; not only the dilution of skilled labour by unskilled, but also longer hours of work and the decreased possibility of avoiding monotonous tasks; also a certain amount of initial disorganisation inevitable at a changeover of personnel and plant to meet new and special conditions. This is all the more reason why no time or energy should be spared to deal with the educational side of accident prevention; and the continuance of the efforts of the National "Safety First" Association towards spreading propaganda to this end is more than ever essential. It is good news to know that their experience of twenty years' successful work will not be wasted.

CHEMICAL DEVELOPMENT IN ITALY

ACCORDING to American reports the production of certain chemicals in Italy, which already showed a considerable improvement during 1938, has further increased during the first four months of this year.

The production of calcium carbide was 34,178 metric tons during the period January-April, 1939, compared with 29,513 metric tons for the corresponding period in 1938, and of nitric acid 120,230 metric tons compared with 103,547 metric tons in 1938.

It is stated in connection with the development of the chemical industry that the following firms have received authorisation to enlarge or erect new establishments in the country:—

S. A. MAGNESIO ITALIANO SULCIS S.A.M.I.S., Turin: New plant at Aosta for the production of magnesium ore and metal.

CESARE FRACCARI E.C., Milan: Enlargement of laboratory at Valenza Po for the working of gold, silver and platinum, and for recovery of such metals from ash.

SUCCESSORI LUIGI COLOMBO, Lecce: Installation of two ovens for processing dolomite.

S. A. "APE" APPLICAZIONI PROCESSI ELETTROCHIMICI, Genoa: Installation of electrochemical machinery in San Dalmazzo di Tenda plants for the production of caustic soda and chlorine.

SOC. ELETTRICA ED ELETTROCHIMICA DEL CAFFARO, Milan: New plant in Apuania for the production of insecticides based on copper oxychloride, cupro-ammonium salts, and cupro-organic preparations.

New York Chemical Exhibition

New Drying System on View

OVER forty industries, producing chemical materials and equipment, will display their newest products at the seventeenth American Exposition of Chemical Industries. The exhibition, for which nearly 300 exhibitors have already engaged space, will be held at Grand Central Palace, New York, during the week of December 4 to 9, 1939. Chemical research in the United States received its first big incentive in the World War crisis. Under pressure it established a world position which it has maintained ever since. Each year has brought new and greater achievements for the health, comfort, and safety of the world. The Exposition of Chemical Industries, established in 1915, has played an important part in this progress.

In addition to the chemical raw materials and manufactured products which the chemical industry will exhibit, there will be many displays devoted to metals and alloys; also to the new synthetic plastics and their very varied applications. Plant and equipment, applicable to each of the processes of chemical engineering, will also be shown. The process equipment to be shown in operation will include units for crushing and grinding, flow of fluids, materials handling, filtration, drying, evaporation, distillation. Other classifications will include packages, containers and packaging machinery; instruments of precision, laboratory equipment and supplies; pumps, piping and steam process accessories; also mill and factory supplies including refractories, cements, coating materials, packing supplies, fire-extinguishing systems, factory wash fountains, safety equipment, etc. The latest type equipment for drying chemical materials in solid, or powder, form is available for operation with steam, electric, gas, or oil heat. Applications of these units to drying paint pigments, fine chemicals, pharmaceutical materials, and rayon will be shown. Direct-heat rotary dryers will show large evaporative capacity and high thermal efficiency. Some of the new units are especially well adapted to drying organic and other heat-sensitive materials. A new drying system on which patents are pending will be exhibited for the first time. This system is said to make unusual use of exhaust gases not only to preheat the wet material as it is fed into the drier, but also to trap dust. The system is reported to offer high efficiency in handling light-weight, finely-divided materials having high moisture content. Modern centrifugal driers designed for the process industries will feature new units of increased ratings. On the suspended type, improvements emphasise stability at high speed, and increased production.

Metals and alloys will be represented in terms of the metals themselves, through demonstrations of manufacturing processes, and by the innumerable applications for which they are used in the chemical industry. Bronze, iron, steel, and a wide variety of alloys will be featured in valves of all types, and also in liquid level gauges. Chemical compounds and natural minerals of titanium and zirconium will be shown. These elements will also be represented in terms of chemicals, ceramics, refractories, and metallurgical products. Platinum and palladium will be exhibited in their role as catalysts, also as laboratory ware, spinnerets for rayon, and electrical contacts.

Chemical Engineering Lectures

The course of lectures on chemical engineering principles and applications, held regularly in connection with this series of exhibitions will again be conducted at the Seventeenth Exposition. Professor W. T. Read, Dean of Chemistry at Rutgers University, will be in charge. The courses offer a unique setting in which to co-ordinate theory and practice. Nowhere else in the world is there such a complete collection of chemical engineering equipment assembled at one place at one time. The Seventeenth Exposition of Chemical Industries, like its predecessors, will be under the direction of C. F. Roth, President of the International Exposition Co.

New Control Orders

Molasses, Industrial Alcohol, Acetone, Acetates

IN pursuance of a Second Order made under the Defence of the Realm Regulations, dealings in molasses, industrial alcohol, acetone, acetic acid, butyl alcohol, amyl acetate, butyl acetate, ethyl acetate and fusel oil are now subject to restrictions as to maximum prices. A schedule of maximum prices is attached to the Order. No maximum prices have been fixed for deliveries of less than 40 gallons of molasses, for deliveries of less than ten gallons of industrial alcohol (excluding power methylated spirit), acetone, acetic acid or fusel oil and for deliveries of less than 5 gallons of butyl alcohol, amyl acetate, butyl acetate or ethyl acetate. Dealings in the materials specified above situate outside the United Kingdom by any person in or ordinarily resident in the U.K. are permitted only under the authority of a licence granted by the Minister of Supply, or in accordance with a special or general direction issued by the Minister of Supply.

The above provisions came into force on September 29, 1939. With effect from November 1 next, dealings in the materials specified above inside the U.K. will be permitted only under the authority of a licence granted by the Minister of Supply, or in accordance with a special or general direction issued by the Minister. In the case of mineralised methylated spirit, producers may supply to their normal customers in any period of six months a quantity not exceeding that supplied during the period of six months ended August 31, 1939, and it will be unnecessary for a person who desires to acquire or consume mineralised methylated spirit to hold a licence or direction. For all other of the controlled materials it will be necessary for a person who desires to acquire or consume such materials to hold a licence or direction issued by the Minister of Supply. No licence, however, will be necessary for the acquisition or consumption of a quantity of molasses not exceeding six tons in any period of six months or for the acquisition or consumption of any controlled material (other than molasses or mineralised methylated spirit) not exceeding sixty gallons in any period of six months.

Although licences are not required until November 1, applications for licences for supplies of the controlled materials during the month of November should be sent as soon as possible to the Ministry of Supply, Molasses and Industrial Alcohol Control, Great Burgh, Epsom, Surrey. Copies of forms on which application for licences should be made will be sent to consumers as far as possible in the next few days. Any person who wishes to make application for a licence but who does not receive such a form should apply to the address stated above.

Control of Mercury

In pursuance of Regulation 55 of the Defence Regulations, 1939, the Minister of Supply has issued the Control of Mercury Order, 1939, dated October 3, 1939. This Order lays down maximum prices for certain mercury compounds and prohibits the manufacture, purchase or use of vermilion except under a licence from the Ministry of Supply; no licence, however, is required to purchase less than 7 lb. The Order also provides that all persons engaged in the production or sale or consumption, etc., of mercury or mercurial compounds shall furnish any information relating to his business upon request by the Minister. Copies of the Order, which came into operation on October 6, 1939, may be purchased from H.M. Stationery Office, or through any bookseller. Inquiries should be addressed to the Ministry of Supply (Code HA), Raw Materials Department (Mercury Control), Shell-Mex House, Strand, London. W.C.2.

IMPORTS of coal-tar dyes into the United States, entered for consumption, increased to 3,270,716 pounds ($3,854,722) in the first six months of 1939 from 1,221,348 pounds ($1,602,253) in the same half of 1938 and 1,903,331 pounds ($2,572,927) in the corresponding 1937 months.

THE DEVELOPMENT OF THE TECHNICAL APPLICATIONS OF HYDROGENATION–I.

Industrial Use of Nickel Catalysts

By

E. F. ARMSTRONG and K. A. WILLIAMS*

AT the beginning of the last century lighting was provided by candles and oil lamps. Whale oil was extensively used in the lamps and whale catching was an important and hazardous occupation. The literature of the period contains numerous references to new forms of harpoons. In 1792 came the invention of lighting by gas and the first gas company was founded in London in 1812; it was followed a few years later by a second, in Paris; both were the outcome of the enterprise of one man, a certain F. A. Winsor. Gas companies increased, and 20 years later gas had largely taken the place of whale oil for lighting in towns, although whale oil was used in the country till the adoption of mineral oil lamps. During the last quarter of the 19th century and the first decade of the 20th whale oil lost its importance.

It was thought for a time that oil at a low price could be used for making soap, but it was found useless for this purpose on account of its unsaturated character; on the other hand, its relatively low price caused research work to be carried out to find means of making some use of it.

When industrial chemists had studied the laboratory researches of Sabatier on hydrogenation, causing addition of hydrogen to unsaturated compounds with the help of catalytic agents, more than one chemist in the oil industry was ready to see possibilities of the application of this process to industrial problems, an idea that led to some extensive research. Norman was the most successful experimentalist, and in the works of Joseph Crosfield & Sons at Warrington the conversion of whale oil into a hard white fat with the consistency of tallow became a standard and successful technique giving rise to a remunerative product.

Since those days, hydrogenation of all kinds of liquid or viscous fats has developed into an important industry; and whaling, which includes both the capture of the whales and the treatment of their oil, has become very important and continuously more profitable. To-day the production of whale oil exceeds that of every other oil, and its price, which is the subject of negotiation between the whaling syndicates and the great world markets, controls that of all other oils and fats.

An Economic Surprise

When he applied himself to these researches Sabatier had no idea that they would have economic repercussions of such importance; that, for example, in a certain given season, the planter of coconuts in India would become either rich or poor and that the economic existence of vast tropical regions would be profoundly affected. Such are the surprising results of simple experiments conducted in a test tube or in a retort. The application of catalytic hydrogenation at first brought many difficulties, but about 1910 this process was already yielding an average of several hundreds of tons a week; since then the yield of a hydrogenation installation in the fatty oil industry has been raised to about a thousand tons a day; the process has also been applied commercially to many other substances. First, chemical products may be mentioned, such as phenol, the cresols, naphthalene, and pyridine, of which the production, although relatively small, is important from a technical point of vieiw. Recent years have seen the application of this process to the treatment of carbon and petroleum oils, and here the production is enormous.

The earliest commercial progress for the catalytic hydrogenation of fatty oils was based on the agitation of a mixture of nickel catalyst and oil in a hydrogen atmosphere, in heated autoclaves, under a pressure slightly greater than atmospheric. The speed of the reaction can be easily controlled; a rapid examination of the product at regular intervals allows the operation to be arrested when the reduction has reached the desired point. This method still forms the basis of the majority of technical processes and since the yield is high it is probably still the most used method. However, a recent improvement in the continuous process employing a massive nickel catalyst will probably result in the extension of the use of this method of working. The progress which has been achieved has put a different light on two principal aspects; experience has shown how carefully catalysts must be handled and has emphasised the importance of the extreme "cleanliness" that is necessary if high efficiency is required; and, furthermore, by continually studying the chemistry of the reactions that occur and the manner in which they can be modified and controlled at will, a considerable amount of information has been amassed.

The hydrogenatable fats are—besides whale oil—soya-bean oil, cotton-seed oil, ground-nut oil and others. Before hydrogenation they must be refined in such a way that the impurities derived from the "flesh" of the whale or the seed of vegetable fats are suitably decreased. This refining is one of the most important requirements of the process, since upon its success depends the whole economic value of the process.

Methods of Purification

Improvements are gradually being made on old methods of refining, and new processes destined to diminish further the specific impurities are discovered from time to time. Without these it is doubtful whether the method would have reached its practical importance. The hydrogen used must be of high purity and much progress has been made in this direction. The first experiments to utilise hydrogen prepared by the action of steam on iron or by purification of water gas were satisfactory up to a point; but recently hydrogen obtained by these processes has largely been replaced by electrolytic hydrogen. Such hydrogen is naturally more expensive than that obtained by other methods; and this has led to more recent experiments tending towards a return to the older methods by using more efficacious means of purification. It is, however, doubtful whether these efforts are of moment in the fatty oil industry, although the purified gas may be suitable for those catalytic processes in which "cleanliness" is not of prime importance. This is true especially for the hydrogenation of mineral oils, because the catalysts here used are chosen for their robustness and resistance to poisons; on the other hand, the matter treated is such that less severe conditions of cleanliness can be accepted.

In the industrial hydrogenation of fatty oils, the catalyst is invariably nickel. It may be prepared by reduction of nickel carbonate supported on an inert material (kieselguhr, etc.), or equally well of nickel formate; lastly in the continuous process, important from a technical point of view, the catalyst may be nickel oxide supported by the nickel itself, in the form of perforated plates or leaves.

According to the form in which it is prepared the catalyst is more or less sensitive and needs appropriate treatment. Sulphur, in every form, quickly poisons it and its efficacy is reduced by many other bodies, among which may be mentioned mercury, lead, selenium, carbon monoxide and various types of organic matter. Even a trace of crude oil has a

* Translated from *Chimie et Industrie*, August 1939, p. 234.

harmful effect on the catalyser. Thus it will be clear that both the oil and the hydrogen must be purified. These remarks will show that to operate industrial catalysis it is obligatory, at the price of long and costly effort, to elucidate one by one the different possible causes of poisoning and gradually to eliminate them.

Catalytic hydrogenation of many chemical products consists in the direct addition of hydrogen to the double bonds of unsaturated compounds, and if there is present more than one double bond, the reaction can take place to completion in each molecule affected, or it may be stopped at an intermediate stage. It is usually more difficult to eliminate unsaturation in an aromatic nucleus than in open chains; and in an open chain containing several different bonds one will be more quickly reduced than another. The facility with which isomerism can appear under the conditions of treatment is another source of complications.

Dealing more particularly with fatty oils, it can be shown that by their very nature they are complicated. They consist of complex mixtures of glycerol esters of several fatty acids. The fatty acids have all their chains of the same length, but they differ in their degree of unsaturation and as a rule include saturated acids and acids with 1, 2, 3, and even more double bonds. Three acid radicals are attached to each glycerol radical, but in what way? That is what we, even to-day, do not yet precisely know, although the researches of Hilditch and his collaborators are throwing more and more light on this subject. It is not known whether in every instance the method or the order of attachment to the glycerine nucleus plays a part in the relative facility of reduction of different unsaturated acids. It is believed, however, that in the majority of cases the arrangement is of little importance and that as long as the acids remain bound to the glycerine the course of the reaction depends on other factors. It is quite a different matter when the fatty acids are not combined; it is the same as if a mixture of free fatty acids and neutral fats is treated.

Hydrogenation Reactions

Hydrogenation of free fatty acids and their esters or of a simple mixture of the most complex natural oils has been studied in detail during the forty years in which this process has been of interest, and a large number of interesting facts have been collected on this subject. The possible reactions may be described as follows:

Acids with double bond are hydrogenated into saturated acids: oleic acid, for example, is transformed into stearic acid. At the same time, part of the acid is isomerised. It is in this way that oleic acid forms a solid isomer (iso-oleic acid), probably by displacement of the double bond, but perhaps more simply by simple stereo-isomerism. The proportion in which this isomer is found depends undoubtedly on the conditions of reaction, for here we have two or even three simultaneous hydrogenation reactions, comprising isomerism and stereo-isomerism, to which may be added the ulterior reaction of hydrogenation of the isomers, all of them proceeding with different reaction velocities and having different temperature coefficients.

That the reactions of isomerisation and hydrogenation may be simultaneous and not consecutive is shown by the fact that, under constant conditions, the proportion between the isomers tends towards a constant value after the reaction has taken place up to a fixed point. Consequently, this proportion is maintained until saturation is complete.

The proportion depends on the temperature, perhaps also on the pressure, and certainly on the activity of the catalyst; on the relative degree of admixture of oil, catalyst, and hydrogen; on the rapidity of desorption of the reacting molecules of the catalyst; and on the nature of the latter. Thus, isomerism is more marked with platinum, less so with palladium, still less with nickel, and least of all with copper.

Researches as yet unpublished, carried out by one of the authors, suggest that the proportions, and consequently the reactions themselves, are controlled by the excess of electronic energy acquired by hydrogen when it leaves the metal catalyst, and in the course of its ulterior passage into the oil molecule. Thus the thermionic power of the metal may play a decisive part in the theoretical basis of hydrogenation.

As regards *acids with double bonds*, such as linoleic acid, the position is more complicated, since the possibilities are more numerous. In practice, it usually happens that one of the bonds reacts first, then the other, but at least two isomers are formed in the first phase, and two others in the second. Under different conditions there is a variation in the proportion in which the two phases encroach upon each other, while under certain conditions they even take place simultaneously. In the first phases, the equilibrium pressure mentioned above for oleic acid is established here. In practice it is admitted that in this region the two reactions are on the same plane and that, being subject to the same influence, they follow the same course.

Acids with a high degree of unsaturation.—The reaction in these cases has not yet been studied in detail, but it is certain that it is still more complicated than those already described. It appears that simplification in the last two phases should be applied.

Natural oils being mixtures of these acids in an ester form naturally undergo extremely complex changes during hydrogenation. The factors coming into play from a technical point of view are temperature, pressure, activity of the catalyst, the state of the division of the catalyst (or the nature of its surface), degree of contact of the oil, the hydrogen and the catalyst, and the time of conduct. Recourse may be had to the controlled poisoning of a catalyst before its use, to make a variation in the products, and even the use of promoters (such as the alkalies) and a mixture of other metals with nickel may be of some use.

When a fatty oil is hydrogenated the least saturated fatty acids (radicals) tend to be attacked first. At higher temperatures than those ordinarily used, this selective action is so marked that few or none of the saturated acids are formed until the degree of unsaturation has been reduced to an average of a double bond per acid radical. At the lowest temperatures the effect is less marked, and at 100° C. or less there is little selectivity. At the ordinary temperature the latter seems no longer apparent and every double bond is attacked at the beginning of the reaction. This effect of temperature is probably helped, if not caused, by the very high mobility of the molecule at the highest temperatures. Consequently, the molecule is detached more easily from the catalysts after a double bond has reacted and before another can take place. There can no longer be any doubt that the carbon atoms between which the double bond is situated are joined more or less solidly to the surface of the catalysts at the moment of the reaction and that the transfer of hydrogen absorbed or bound electronically to the metal. is then produced with exchanges of energy with a still higher yield. It must likewise be remembered that if free fatty acids are present there is also attraction between the carboxyl group and the catalyst and this attraction is more powerful than the union of the double bond. In a mixture of free fatty acid and neutral oil this leads to a preferential, and selective, hydrogenation of the free acid.

(To be continued.)

THE Minister of Health has issued a statutory order, cited as "The Alkali, etc., Works Order, 1939 (No. 1299)," whereby cadmium and its compounds are added to the list of gases and fumes to be included within the expression "noxious or offensive gas" in the Alkali Works Regulation Act of 1906; while to the schedule of works mentioned in the same Act have been added: "Lead Works, that is to say, works in which, by the application of heat, lead is extracted from any material containing lead or its compounds, and works in which compounds of lead are manufactured from metallic lead or its compounds by dry processes which give rise to dust or fume."

RECOVERY OF WASTE VAPOURS*

The Adsorption and Regeneration Process

VAPOURS lost in manufacturing processes are generally valuable, and even in relatively small plants their waste means the loss of substantial sums of money. Solvent vapours are perhaps of greatest economic importance, because solvents are used in large quantities and are expensive. The recovery of alcohol from fermentation gases and of carbon disulphide in viscose production, not yet practised in the U.S.A. to any great extent, also represent potential sources of income for progressive manufacturers.

The methods of recovering vapours may be divided into three broad classes: 1. Condensation by refrigeration or compression; 2. Absorption by fluids; 3. Adsorption by solids. All these have one thing in common, and that is that the vapours must be collected with the greatest possible efficiency. No recovery equipment can be expected to return for re-use vapours not collected and delivered to it. Means for collection of vapours will vary greatly. They depend on the type of machine or apparatus from which the vapours emanate, the kind of vapours being handled, and the work being done.

Perhaps the simplest way of recovering vapours is by condensing them out of the carrying medium (usually air). Such condensation takes place whenever at a given temperature the vapour concentration exceeds the saturation point of the carrying medium. Cooling and compression reduce the concentration representing saturation, and precipitation occurs. The operation of such systems requires an initial vapour concentration as high as possible, generally falling within the explosive range or above it. This represents the main objection to the use of direct condensation in vapour recovery, and since the yield or efficiency of recovery is rarely as much as 50 per cent. of the vapour delivered to the recovery unit, this method of recovery finds little use.

Herbert[1] has given values for condensation of a number of typical solvent vapours at various temperatures. For instance, air must contain at least about 200 gr. of benzene, 380 gr. of acetone, or 1,300 gr. of ether per cubic metre in order to cause condensation at 10° C. All these values are above the explosive range of the vapours named, but to reach such concentrations it is necessary to pass through the explosive range on starting and stopping the apparatus wherein evaporation takes place. In order to increase the efficiency of recovery, use has been made of machines fully enclosed, with drying compartments at high temperature and cooled walls and floors, these cooled surfaces serving as condensers. The extent of tightness required is such that it interferes with operation and inspection, and although a substantial increase in recovery efficiency is attained, does not do away with the danger of explosion on starting and stopping.

Recovery by Absorption

In the absorption systems vapours are removed from the carrying medium by intimate contact with an absorbent fluid flowing countercurrent through a scrubbing tower. Such methods have been comprehensively considered by Weissenberger[2] and his co-workers. They make use of the solubility of vapours in various fluids. The quantity absorbed is proportional to the concentration of vapour in the carrying medium, and is dependent on the vapour pressure and boiling point of the substance being absorbed so long as no chemical interaction occurs between it and the scrubbing fluid. These methods have the advantage over condensation in that they do not require high concentration for economical operation. Their main disadvantages are that they cannot always successfully operate below the lower explosive limit, that uniform rate and composition of feed are required, and that it is invariably necessary to subject the recovered substance to further purification before reuse. Spurlock[3] has given a very interesting example of the calculation of an installation for the recovery of acetone by water scrubbing.

The Adsorption System

Adsorption on a solid adsorbent such as activated carbon is probably the most satisfactory way of effecting vapour recovery. It has the advantage of being able satisfactorily to operate at concentrations far below the lower explosive limit and at the same time extracting nearly 100 per cent. of the vapour in the air passed through the adsorbent. This type of recovery has been so successful in its application that we will consider at some length the recovery of vapours as carried out with activated carbon.

As has been pointed out above, it is necessary to collect as much of the vapour as possible in order to attain a high efficiency of recovery and thereby increase the profit from the recovery installation. To this end hoods or covers, designed to enclose the apparatus wherein vapours are generated without interfering with its operation, are fitted around the equipment. In the case of a coating or impregnating machine or printing press the vapours are collected with large volumes of air. In the recovery of alcohol vapours from fermentation CO_2 the carrying medium is fermentation gas.

In some cases, as in the recovery of CS_2 in a viscose plant, impurities are collected at the same time (in this case H_2S, sulphuric acid mist, sulphates, etc.) and should be separated or removed to facilitate the recovery operation. As an example, we shall consider the recovery of solvent vapours. The air is admitted to the recovery units or adsorbers after passing through an air filter and flame arrester. This apparatus is so constructed that if accidental fire occurs in the workroom or in one of the machines where solvent is evaporated, it will effectively prevent the passage of flame into the recovery equipment. Dust and finely divided matter are likewise kept out of the adsorbers.

EXPLOSIVE LIMITS OF SOME TYPICAL VAPOURS.

	Explosive Limits			
	Lower		Upper	
Vapour	% by vol.	g/M³	% by vol.	g/M³
Acetone	2.5	60.5	9.0	218
Alcohol (ethyl)	4.0	73.3	14.0	256
Alcohol (methyl)	5.5	73.4	21.0	280
Benzene	1.5	48.7	9.5	308
Carbon disulphide	1.0	32.0	50.0	1,580
Ethyl acetate	3.25	82.4	11.0	403
Ethyl ether	1.25	38.6	10.0	308
Ethyl formate	3.5	108.0	16.5	510
Methyl acetate	4.1	126.0	14.0	430
Methyl ethyl ketone	2.0	60.0	12.0	180
Toluene	1.3	50.0	7.0	268

The solvent-laden air, after being filtered, is admitted to an adsorber, of which there are generally two. This is the first stage of the recovery process and is called adsorption. The adsorber contains a bed of highly activated carbon which adsorbs the solvent vapours contained in the laden air, after which the denuded air is discharged outside the building. When the activated carbon has become saturated with solvent vapours, the flow of laden air is diverted to a second adsorber while the first enters the second stage of the recovery process—regeneration.

The Regeneration Stage

Regeneration consists of removing from the carbon in the adsorber the vapours it has adsorbed and removed from the vapour-laden air. To this end, steam is admitted into the adsorber to distil the adsorbed vapours, and the distillate is

* Adapted from an article by E. L. Luaces, well known as a chemical consultant in the U.S.A., from *Chemical Industries*, Vol. 45, No. 3, part 1.

sent to a suitable condenser forming part of the recovery installation. The vapour is recovered as a water mixture or water solution, depending on whether or not the solvent is miscible with water. If the solvent is miscible with water, as in the case of ethyl acetate, alcohol, and acetone, the condensate is delivered to a suitable rectifying column to separate the solvent from the water. If the recovered solvent is immiscible with water, as in the case of naphtha, benzene, and trichlorethylene, a decanter separates the water, which is discharged into the sewer, from the solvent, which is delivered to storage. In some cases miscible and immiscible solvents form part of the solvent mixture used. In such cases the immiscible portion is decanted and the water containing the miscible portion is delivered to the rectifying column. When all the adsorbed vapours have been distilled from the activated carbon in the adsorber, this is ready for the third and last stage of the recovery process—drying and cooling.

A certain amount of steam is condensed during distillation and the carbon is wetted. If the nature of the vapours being adsorbed is such that moisture in the adsorbent would interfere with their removal from the vapour-laden air, the adsorbent is dried. To this end warm air is circulated through the carbon bed in the adsorber until the moisture has been removed. This warm air may be obtained in several ways. It may, for instance, be artificially produced by passing room air through a suitable heater. A second way is to provide the adsorber with a heat regenerator within its body. Generally the regenerator is placed at the bottom. Steam is passed downward during the distilling period. It passes through the activated carbon bed and then through the heat regenerator, to which it gives up part of its heat. If at the end of the steaming period air is passed upward through the heat regenerator and the activated carbon bed, it will adsorb heat from the former and give it up to the latter, thereby driving off the moisture held by the activated carbon bed. If no drying is done, the adsorbent is cooled by passing process (denuded) air from one adsorber through a second adsorber, or room air may be used instead. If the adsorber is provided with a heat regenerator, it will cool to room temperature shortly after the heat has been dissipated from the regenerator due to the fact that the room air used is no longer being heated. If process air or room air is used, no cooling is necessary, in view of the fact that the bed temperature at the end of the drying period will be sufficiently low to allow the carbon properly to adsorb vapours from the laden air.

Large plants may have more than two adsorbers. In two-adsorber systems one adsorber is in service while the second is being distilled, dried, and cooled. In three-adsorber systems one is in service, a second is being distilled, and a third dried and cooled. It is seldom that more than three adsorbers are used. Adsorption plants are engineered in such fashion that flexibility is one of their virtues. and while they are designed for continuous use, they may be operated intermittently without any additional cost. To handle a lower evaporation rate the cycle of adsorption need only be increased. If a reasonably higher evaporation rate is temporarily necessary, the cycle might be shortened to take care of it.

European and American Practice

The designing of vapour recovery installations using adsorbents requires a thorough knowledge of adsorption and the use of a great deal of practical data acquired only through experience. Many factors influence the final result and must be considered. To name a few: concentration, air temperature and velocity, bed thickness, per cent. saturation, break-point of adsorbent. Various designers will attack the problem from various angles and reach substantially the same goal by different roads. Custom and local conditions play an important part in arriving at the ultimate design and account for the great *apparent* differences in American and European practice.

While vapour recovery by adsorption seems to have had its origin in Europe shortly before the Great War, it received much attention in the United States after the war, and the first large-scale use of the process was probably made there. Even so, Europe to-day leads in number of installations with over one thousand, but most units are small as compared with American installations. In the United States some sixty installations are now in use, most of them recovering complex solvent mixtures with a high degree of efficiency. European practice is characterised by the use of equipment set vertically and in the construction of which low labour costs are reflected. American designers originally worked along the same line, then went over entirely to horizontally disposed adsorbers, and only in very recent years have begun to swing back. Horizontal adsorbers still predominate in American design, but vertical adsorbers have been installed in at least five adsorption plants during the last three years. Use of high-velocity, high-turbulence, self-cleaning condensers and coolers distinguishes these newer American installations from their European counterpart.

Automatic operation of recovery systems of the kind under discussion has been developed to a high degree of perfection. The first attempts to provide automatic control for adsorption apparatus resulted in cumbersome arrangements which do not seem to have found acceptance. More recently compact, flexible, simple controlling devices have been designed for this purpose and are in the course of being protected by patents. Three adsorption installations operated fully automatically on a predetermined cycle by a system of control originated by the author have been in successful use, two of them for some time. Automatic operation reduces labour to a casual, supervisory, record-taking incident, and by bringing about economies through prevention of waste (each operation is performed at the exact moment required) savings are increased and operating costs reduced to a minimum.

[1] Herbert, W., Chem. Ztg., 55, 577, 595. 615 (1931).

[2] Weissenberger, G. et al., Monatsh. f. Chem., 45, 187, 281, 413, 425, 437, 449 (1924); Z. f. ang. Chem., 38, 359, 626, 1010 (1925).

[3] Spurlock, B., Trans., A. I. Ch. E., 31, 575 (1935).

AUSTRALIAN TARIFF AMENDMENTS

THE Australian Government has made a number of Customs and Excise Tariff amendments including increases in customs duties. The British Preferential Tariff and the General Tariff rates on crude petroleum n.e.i., crude petroleum enriched with a distillate from crude petroleum n.e.i., having a recoverable petrol content exceeding 70 per cent. have been increased from 7d. to 8d. per gallon in each case. B.P.T. and G.T. rates of 1d. per gallon have been imposed on crude petroleum, residual oil, solar oil, for use as a fuel provided recoverable petrol content of crude petroleum does not exceed 15 per cent., as prescribed by departmental by-laws. These goods were formerly admitted free. B.P.T. and G.T. rates on petroleum and shale products (naphtha, benzene, benzoline, gasoline, pentane, petrol and any other petroleum or shale spirit) have been increased from 7d. to 8d. per gallon, and similar increases have been imposed on turpentine substitutes, n.e.i. Coal tar products (benzol and naphtha) rates have increased from 5d. to 6d. in respect of British Preferential Tariff, and 8d. to 9d. in respect of General Tariff.

Excise duties have been increased on the following products:—Petrol, benzene, benzoline, gasoline, naphtha, pentane and any other petroleum or shale spirit, having a flash point of under 73° F., n.e.i., 6½d. per gallon (formerly 5½d.); turpentine substitutes, n.e.i., 6½d. per gallon (5½d.); benzol, 2½d. per gallon (1½d.); coal tar and coke oven distillates suitable for use as petrol substitutes, n.e.i., 6½d. per gallon (5½d.); fuel oil resulting from refining, processing or distillation of petroleum, coal or shale products, 1d. per gallon (nil).

LETTERS TO THE EDITOR

Welding Methods in Chemical Plant

SIR,—Referring to the article in your issue of September 30 and Mr. Coulson-Smith's observations in your issue of October 7, it must not be overlooked that if it were not for the ability to butt-weld steel plate efficiently, the cost of petrol to the suppliers would easily be doubled or trebled, as it would be impossible to manufacture vessels required for modern cracking methods which give such high petrol yields. Hundreds of such high pressure vessels working at high temperatures are in operation these days at Oil Refineries, and these vessels simply could not be made by riveted construction. Also in the chemical industry we find high pressure absorption columns and other classes of vessels where one modern high pressure vessel 6 ft. in diameter by 60 ft. in height gives the same output at greater efficiency and reduced cost, as compared with the old atmospheric pressure type of absorption column 25 ft. in diameter by 75 ft. in height. So it is due to the foresight, metallurgical and chemical research, and engineering designing ability of the large oil companies, and such great concerns as the I.C.I., together with the ability of such experts on welding as Messrs. Lloyd's Register of Shipping, that the merits of welding in preference to riveting have been recognised.

After extensive fatigue research by such a celebrated authority as Dr. B. P. Haigh, of Greenwich Naval College, it is astonishing that there are still people to be found who maintain that a riveted joint is safer than a properly welded one. It can be said without hesitation that if two specimens are made up, one of two plates riveted together by any possible method, either lap or butt-jointed and with or without butt straps, and the other of two plates butt-welded together, even assuming that the welding is not 100 per cent. perfect, and these two sets of specimens are tested for their fatigue limits, the welded joint will always give a higher result.

From a corrosion point of view, if the welded joint is heat-treated it will be less subject to corrosive attack, no matter of what nature, than the riveted joint with its embrittled plate round the rivets. In fact, provided a welded vessel is heat-treated after welding, and the welding has been properly done, the weld will stand up to either corrosion or high temperatures just as well as the plate. The writer can point to hundreds of furnace jackets, annealing pots, etc., made from boiler plate which are continuously in operation at temperatures of over 800° C. and which are continually wearing out but without any evidence that the welding wears any faster than the plate. In the case of galvanising pots, it is usual to have the 2 in. thick walls of these pots fire-welded, but the life of two electrically welded pots was considerably longer than any fire-welded pot used in the same galvanising works.

For unfired pressure vessels Messrs. Lloyd's code allows an efficiency of 90 per cent. of that of the plate for the butt-welded joint. In viewing hundreds of mechanical tests of Class (1) welded work of this description, the writer has never seen a main pull on a butt-welded joint result in a tensile stress of less than the minimum tensile stress specified for the plate ordered from the mills, nor has he seen a pull made on the all-weld metal specimen give a tensile stress less than the minimum tensile of the boiler plate.

As regards bend tests, the B.S.I. Specifications only require the boiler plate itself to be bent round a former of a diameter three times the thickness of the plate, whereas Messrs. Lloyd's require the $\frac{3}{8}$ in. thick butt-welded specimens to be bent round a former of the same diameter as the thickness of the plate, which is quite easy to obtain when suitable electrodes and methods of welding are adopted. In fact, usually the two limbs of the specimens can be flattened out one on top of the other without any signs of cracking of the weld, which is, of course, at the bend.

Some doubt is expressed in your article with regard to the welding of stainless steel plates. Let it be said that, provided a stabiliser such as titanium and tungsten, which is used by Messrs. Firth-Vickers in their "F.D.P." 18/8 stainless steel, is used, or in lieu thereof niobium (columbium) such as the Americans use, and further, provided titanium or preferably, in the writer's opinion, columbium (columbium being of at least ten times the carbon content) is used in the coating of the stainless steel rod used for welding, there is no possibility of any carbon precipitation round the grain boundaries of either the weld or the parent metal which would cause weld decay, and in fact stainless steel welds can, and have, been made which will stand up to the full Admiralty copper-sulphate-sulphuric-acid corrosion test specified for the stainless steel plate itself.

Finally, there is no doubt in the writer's mind that it is essential for the highest class of pressure vessel work, that the whole of the welding shall be X-rayed, the cost of which is greatly off-set by the certainty with which higher joint efficiencies up to 90 per cent. can be allowed, which considerably reduces the thickness of scantlings necessary if X-raying, heat treatment and mechanical tests are not adopted.

As regards the remarks that have been made on the relative merits of different methods of welding, there is little doubt that excellent welding can be done by the oxy-acetylene method provided suitable rods—containing the right proportions of silicon and manganese so as to produce a fluid slag which readily floats to the surface of the metal, effectively cleansing the weld metal and blanketing it against oxidation—are used.

Atomic hydrogen welding is another method by which good results are obtained, but equally good results are obtainable by the electric arc method if suitable covered rods, or the latest "Unionmelt" method is adopted, with the advantage that on thicker plates the electric arc or "Unionmelt" process is very much cheaper and hence is universally adopted for Class (1) pressure vessels, and in fact any class of welding where medium or heavy plates are used.—Yours faithfully,

H. B. FERGUSSON,
Director,
G. A. Harvey and Co. (London), Ltd.

London, S.E.7. Oct. 9.

SIR,—Mr. C. Coulson-Smith's letter is an admirable illustration of the controversial methods which he deplores of many years ago "when advocates of each process rivalled each other in suggesting disadvantages to the detriment of the opposing camp." It is, of course, well known that there is still competition between those whose interests lie in welding by certain combustible gases and those whose interests lie in electric welding. There is no difficulty in discovering which school Mr. Coulson-Smith belongs.

I can assure him that it was not my intention to arouse the war cries of partisanship, but to assist in bringing before the chemical industry the advantages of welding for many classes of work.

I do not hold with Mr. Coulson-Smith's thesis that welding is not still in its infancy because I believe that it is still capable of very great advances; but here there is probably nothing more than a difference of interpretation between us. I cannot agree, however, that welding is completely dependable in all circumstances and virtually independent of the personal equation. I do not think any practical welder would agree with Mr. Coulson-Smith on this point. If welding is so dependable and fool-proof, why is it that so many important welding concerns are going to the considerable expense of installing X-ray apparatus in order that hidden defects in the welds can be discovered? For certain classes of work Lloyds insist on X-ray examination.

Nor can I support Mr. Coulson-Smith's attempt to prove that there is no change in structure after welding, and that this change when it occurs "is much less likely to cause corrosion due to electrolytic action than is the presence of a

(Continued on page 276)

PERSONAL NOTES

MR. WILLIAM J. RUSTON was recently elected to the board of Ruston and Hornsby, Ltd., engineers.

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MR. DANIEL S. MUNN retired on Monday after 26 years' service as gas manager at Renfrew, Scotland. He was responsible for the installation of the burgh's new £30,000 undertaking in 1924.

* * * *

THE directors of Redfern's Rubber Works, Ltd., the well-known rubber manufacturers of Hyde, have invited MR. RICHARD BREERTON and MR. JOHN DOUGLAS to join the board of directors. Mr. Breerton has been with the company for 33 years and for the past 15 years has been sales manager of the Ebonite and Mechanical Rubber Department. Mr. Douglas has been with the company for 17 years and for the past seven years has been sales manager of the National Advertisers and Rubber Flooring Departments.

* * * *

UNDER the Order in Council dated February 6, 1928, the Lord President of the Council has appointed SIR JOSEPH BARCROFT, C.B.E., M.D., D.Sc., Sc.D., F.R.S., SIR HAROLD B. HARTLEY, C.B.E., M.C., D.Sc., F.R.S., and SIR FRANK E. SMITH, G.B.E., K.C.B., D.Sc., LL.D., F.R.S., to be members of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research. The Rt. Hon. Lord Cadman of Silverdale, G.C.M.G., D.Sc., LL.D., and Sir James Jeans, O.M., D.Sc., LL.D., F.R.S., have retired from the Council on completion of their terms of office.

Sir Harold Hartley.

Sir Frank Smith.

* * * *

MR. R. A. KINNES, chief accountant of Courtaulds, Ltd., has been appointed a director of the company.

* * * *

PROFESSOR A. M. BRYAN has been appointed Deputy Director of Mining Supplies by the Secretary of Mines. Professor Bryan is a member of the committee which was set up last May to co-ordinate measures for eliminating coal-dust in mines. A native of Burnbank, he was educated at Hamilton Academy and Glasgow University, to which he later returned as Dixon Professor of Mining. He was also appointed Professor of Mining at the Royal Technical College, Glasgow, in 1932. His practical experience of mining was gained in Lanarkshire coalfields. In 1920 he was appointed H.M. Junior Inspector of Mines for the northern division and was promoted to senior rank in 1926.

LETTERS TO THE EDITOR

(*Continued from page* 275)

riveted seam." The process of welding superimposes an entirely new set of conditions upon the metal which must change its crystal structure and frequently its rational composition (not necessarily its ultimate composition). I am quite well aware that certain smaller apparatus can be normalised after welding; but undoubtedly, difference of chemical composition is one of the most potent causes of electrolytic action.

At this stage it is hardly necessary to go deeply into the subject of impurities in welds, so much having been written upon this subject; I cannot, however, allow Mr. Coulson-Smith to "get away" with the suggestion that "in the oxy-acetylene process, free oxygen never comes in contact with the weld metal unless by the express intention of the welder." The action of oxygen on acetylene is to form CO_2, CO and H_2O, all of which compounds are fairly considerably dissociated at the temperatures of welding flames, thus giving rise to opportunities for oxidation. CO_2 and H_2O are in themselves oxidising gases.

I should be the first to agree with Mr. Coulson-Smith that there is a long history of development behind both the arc and the oxy-acetylene welding processes and that impartial welding engineers, amongst whom I hope I am numbered, will realise that sometimes one, sometimes the other, and sometimes neither of the processes is suitable for a particular job. I must agree with him also that it is not a matter of indifference to chemical engineering firms whether welding or riveting is used. In stating, as Mr. Coulson-Smith does, that it is often a matter of success or bankruptcy which is adopted, he is doing no more than recounting the undoubted fact that some firms specialise in welding and others in riveting, so that each type of firm will naturally tend to encourage the type of construction that is best fitted for it to manufacture. Firms that can both rivet and weld are truly neutral and impartial.

I would add in conclusion that I do not desire to enter into any controversy such as Mr. Coulson-Smith has encouraged in his letter, but that it is my object, and there is no doubt that it is also the policy of THE CHEMICAL AGE, to foster impartially every type of engineering construction that is suitable for the work to which it is applied.—Yours faithfully.

October 11. THE WRITER OF THE ARTICLE.

Recent Trade Literature

In commemoration of the 50th anniversary of the foundation of the firm in 1889, the RELIANCE RUBBER CO., LTD., have issued an excellent 64-page illustrated booklet which recounts the romantic story of the rubber industry under the title, "Plastic Gold." Rubber is reputed to be the fifth necessity of civilisation and its industrial development since the days when Amazonian natives produced rubber by smoking the juice of a tree over their hut fires makes entertaining reading. The Reliance Co. state in the foreword: "We can think of no more interesting way of celebrating our Golden Jubilee than by retelling in an interesting way the story of rubber, of the genesis of the trade and the blessings it has brought in these later years." The statement is one with which the reader will readily agree. Easy assimilation of the wealth of detail contained in "Plastic Gold" is made possible by the entertaining manner in which the facts are presented. Chapters are devoted to the early days of raw rubber trade, the history of which is a terrible tale of atrocity and slavery, to the story of the game played by the natives of the Amazon with a huge black rubber ball, probably the forerunner of all the ball games of the present day, to the process by which rubber is extracted from the tree, to the various methods by which rubber has been developed from the raw state, to the unusual uses to which rubber has been put, etc. The publication contains also messages of greetings received by the company and a review of the progress of the firm by Mr. Fordyce Jones, a director. The illustration shown is typical of the many which appear in the book.

W. EDWARDS AND CO., LTD., have issued a new list (ROT.3) which describes the Cenco range of vacuum pumps including the well-known Hyvac two-stage pump. It is claimed that the Cenco pumps are practically indestructible, are unaffected by mercury vapour and therefore can be readily used for backing diffusion pumps. Either the pump with pulley and charge of oil can be supplied or the complete outfit, i.e., the pump mounted on base with motor, pulleys, belt and oil, ready for use. Among the machines illustrated is a Hyvac pump consisting of two distinct rotary units. These are arranged in series on a common horizontal shaft immersed in an outer metal case filled with very low vapour pressure oil.

"Lithcote," a type of non-vitreous baking enamel, forms the subject of a folder recently issued by PRODORITE, LTD. "Lithcote" is a process which has been perfected in America and which is now being used extensively for the lining of tanks and equipment for the chemical industry and allied trades where corrosion-resisting and acid-resisting qualities are vitally important. It is a synthetic lining and coating which can be applied to any metal surface. It is processed and bonded to the prepared face of any metal by a special baking process and it gives a hard, smooth, glass-like, non-chipping, flexible, acid-proof, corrosion-proof, solvent-proof, durable surface. Prodorite, Ltd., announce in the folder that they have acquired from Newton Chambers and Co. Ltd., the manufacturing and development rights for the chemical, textile, plating and de-scaling trades and have installed at their Wednesbury works an up-to-date plant to deal with the application of "Lithcote" linings for these trades.

THE BENJAMIN ELECTRIC, LTD., recently issued a booklet describing and illustrating the features of the Benjamin Anolier indirect lighting system. The outstanding characteristic of Anolier lighting is the way in which the fittings harmonise with the ceiling against which they are viewed. The ceiling looks evenly illuminated on account of the exceptionally wide distribution of the light which ensures a good appearance of uniformity. A typical example of Anolier lighting is type "55" which is made of aluminium with Ali-Tal anodised finish, which not only preserves the metal indefinitely but also brightens the surface and increases the percentage of light reflected by it.

In view of the marked tendency in these days towards the automatic control of processes wherever possible the latest booklet issued by the CAMBRIDGE INSTRUMENT CO., LTD., is of particular interest. It deals with automatic temperature regulators manufactured by the company and includes regulators of many types designed to cover the requirements of practically all industrial processes to which automatic temperature control can be applied. Descriptions are given of controllers for use in conjunction with either base or rare metal thermocouples, resistance thermometers, Féry telescopes, or other suitable electrical means whereby the temperature or other condition to be controlled is measured. Normally, these work upon the potentiometric principle, but when used with electrical resistance thermometers they operate as Wheatstone Bridges. They can be supplied to control temperatures from $-200°$ C. to 2,000° C. The instruments illustrated are resistance thermometers. The air pattern type (Fig. 1) is suitable for temperatures up to 120° C. (250° F.). A polished copper dome with silk covered platinum wire bound on the inner surface is employed, the large area of contact with air ensuring quick action. The element is inserted into a metal box by means of a bayonet fitting, thus enabling the box to be plastered into a wall and permanently wired. The water-tight pattern type (Fig. 2) is suitable also for controlling temperatures up to 120° C. (250° F.). It is similar to the air pattern type, but specially constructed for use in exposed positions, cold stores, vessel holds, etc.

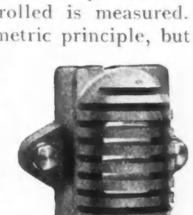

Fig. 1.

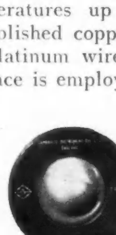

Fig. 2.

Selected items of paint spraying plant and equipment of particular interest at the moment for all kinds of paint spraying, as well as camouflage work, are contained in the latest publication of B.E.N. PATENTS, LTD. Among the machines described and illustrated is the B.E.N. Pneu-Spray portable plant with which a five to six inch wide fan spray can be maintained. This, it is claimed, will be found to give perfect atomisation with exceptionally speedy coverage, using all standard cellulose and oil paints, fillers and distempers. The regulation of spraying pressure is by means of an adjustable air governor, which operates when the pre-set pressure is reached. A camouflage sprayer and sander and spray paint combinations are described also.

General News—From Week to Week

The Iron and Steel Institute offices at 4 Grosvenor Gardens, London, S.W.1, are remaining open. The joint library and information department are also remaining open.

The English lavender oil crop, this year, amounts to 45 acres of lavender, at Fring and Heacham. A distilling plant was installed at Fring in 1936.

In a recent fire at the bleaching works of Boase and Co., Ltd., Claverhouse, near Dundee, the drying plant suffered badly. Damage is estimated at about £4,000.

Fire broke out at the dyeworks of W. A. Atkinson, Ltd., Canal Street, South Wigston, Leicestershire, last week. The prompt attention of the fire services managed to save the greater part of the premises, all of which appeared to be threatened.

In order to discover the best means of utilising laboratories for war needs, the Dominion Research Council, in co-operation with the other Dominions and Great Britain, is conducting a survey tour of laboratories and research rooms, in universities and industrial firms.

The Ministry of Food, in a recent Order gave the maximum selling prices of liquid glucose and invert sugar. Trade firms concerned have received informative circulars. Inquiries should be addressed to: The Director of Sugar Supplies, Ministry of Food, Queen Anne's Chambers, 41 Tothill Street, S.W.1.

It was decided at a recent special meeting of the perfumery and toilet preparations manufacturers' section of the London Chamber of Commerce that cosmetic and perfume prices should remain stationary for the present. It was generally agreed that increased prices would become necessary owing to war conditions.

Burrowite Explosives, Ltd., of Trago Mills, Two Waters Foot, were fined £50 by the magistrates at Liskeard, Cornwall, last week for the alleged unlawful sale of 50 lbs. of explosives to R. L. Lock, of Old Road, Liskeard. The latter, who was charged with having been in unlawful possession of explosives at his quarry and for being without a police certificate, was fined £5.

According to the *Financial News* a process for accelerating the setting and hardening of concrete which consists in adding a controlled amount of flake calcium chloride during mixing is being developed by Imperial Chemical Industries, Ltd. It is stated that the setting rate of the concrete can be accelerated so greatly that work can be carried out safely during the greater part of the winter.

The annual world output of tin oxide in the years 1929-1937 is estimated at 3,500 to 4,000 long tons, according to a report from the International Tin Research and Development Council. Estimates of output in Europe averaged about 1,700 tons annually, while actual production in the United States was reported by the Bureau of the Census at 1,475 long tons. Approximately 3,000 tons of tin per annum was used in making tin oxide, while 3,500 tons were absorbed in the manufacture of stannous chloride and other tin salts.

William Forrest and Son, Ltd., chemical manufacturers, Chain Road, Paisley, were fined £10 at the Paisley Sheriff Court on October 6, for a contravention of the Factory Act, 1937. The charge held to be proved against the respondents was of having two men in a steam boiler without all the steam or hot water inlets being disconnected or valves and taps closed and securely locked. The prosecution arose from a scalding accident which occurred at the works of the firm on January 12 with fatal consequences.

The committee of the Bristol Section of the Society of Chemical Industry has decided that, in the present circumstances, a modification of the Section's activities is necessary. The syllabus will not be issued, but meetings will be arranged and held as frequently as conditions permit and, as far as possible, members will be notified in the usual way, although they are advised to pay close attention to any notices which may be published in the Journal. The meeting arranged for October 5, 1939, was cancelled and it is hoped to arrange one for November, of which notice will be given.

A Scottish correspondent repeats a suggestion made some time ago that the collection of seaweed for war purposes is worth considering. He states that the humble weed has already been made to yield an astonishing variety of products. For example, it is of considerable value in the manufacture of soap, paint, and glass; can be used in the production of imitation leather, and has been made to produce, on an experimental basis, tar, paraffin, and naphtha. As a source of iodine it is, of course, well known, but it can also be utilised in the production of carbonate of soda, bromine, magnesium, and potassium salts. In fact, he adds, only the Japanese soya bean appears to have a comparable measure of versatility.

Emergency Addresses

The Sulphide Corporation, Ltd.'s, temporary offices are at 3 Station Approach, Hinchley Wood, Esher, Surrey.

The emergency address of the Electric Furnace Co., Ltd., is "Netherby," Queen's Road, Weybridge, Surrey.

Goodlass Wall and Lead Industries, Ltd., and subsidiary companies, Limpsfield Court, Oxted, Surrey (telephone: Oxted 2; telegrams: "Lead, Oxted").

Frickers Metal and Chemical Co., Ltd., Great Westminster House, Horsferry Road, London, S.W.1, have removed to Portland Road, Luton, Beds.

I.S.C. Products, Ltd., Great Westminster House, Horsferry Road, London, S.W.1, have removed to Moor Street, Widnes, Lancs.

The address of Liptak Furnace Arches, Ltd., 59 Palace Street, Victoria Street, London, S.W.1, is now "Maxwelton," Boltons Road, Haywards Heath, Sussex.

E. Tyberghein and Co., 15 Cullum Street, London, E.C.3, are now at "Redlands," 154 Fairfax Road, Teddington, Middlesex.

Courtin and Werner, Ltd., have an emergency address at Ballard's Old Brewery, Southover, Lewes, Sussex (telephone: Lewes 615).

All communications for the British Rubber Publicity Association should be addressed to their branch office at 1 Albert Mansions, Lansdowne Road, Croydon, Surrey.

L. A. Sim and Co. (coal tar products) have moved from 231 Strand, London, W.C.2, to 8 Upper Mulgrave Road, Cheam, Surrey (telephone: Vigilant 0041/2; telegraphic: Lasimtar, Sutton).

International Tar and Chemical Products, Ltd., have removed from 27 Finsbury Square, W.C.2, to Essex Chambers, Clarendon Road, Watford, Herts (telephone: Watford 4693).

So that closer contact can be maintained with members and any Government Department to which the Institute of Fuel may be of service, it has been decided to remove the head office to 30 Bramham Gardens, London, S.W.5. (Tel.: Frobisher 3649) to which address all communications should be sent until further notice.

Harrison, Clark, Ltd., The Manor House, South Benfleet, Essex (telephone: Hadleigh, Essex, 58417). A small staff is retained at 16 Water Lane, London, E.C.3, but, if possible, communications should be addressed to South Benfleet. The Birmingham and Manchester branches are continuing as usual.

Frank Segner and Co., Ltd., have now returned to their original address at St. James's House, Brazennose Street, Manchester.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

MANUFACTURE OF MOTOR FUELS.—C. Arnold (Standard Oil Co.). 25441.

MANUFACTURE OF LUMINOUS MOULDINGS, ETC.—L. Baldwin and I. McNeil. (Australia, Sept. 13, '38.) 25347.

SURFACE TREATMENT OF ALUMINIUM and aluminium alloys.—British Aluminium Co., Ltd., and J. T. Richmond. 25360.

PREPARATION OF ORGANIC SULPHONATES.—Colgate-Palmolive-Peet Co. (United States, Sept. 17, '38.) 25572.

MANGANESE ALLOYS.—Consolidated Mining and Smelting Co. of Canada, Ltd. (United States, Sept. 16, '38.) 25430.

PRODUCTION OF DEXTROSE FROM STARCH.—Corn Products Refining Co. (United States, Nov. 28, '38.) 25446.

ZEIN COMPOUNDED WITH SORBITOL.—Corn Products Refining Co. (United States, Dec. 15, '38.) 25447.

PRODUCTION OF STABLE ZEIN SOLUTIONS.—Corn Products Refining Co. (United States, Dec. 15, '38.) 25449.

ZEIN COMPOUND.—Corn Products Refining Co. (United States, Jan. 3.) 25450.

ZEIN ACETATE.—Corn Products Refining Co. (United States, Jan. 7.) 25451.

GAS DETECTOR for ascertaining impurity content, etc., of the atmosphere or chemical gases.—R. Y. Dickinson. 25631.

DEPOLYMERISATION OF POLYMERISED ORGANIC COMPOUNDS.—Distillers Co., Ltd., T. B. Philip, H. M. Stanley, and W. L. Wood. 25234.

PRODUCTION OF TITANIUM PIGMENTS.—E. I. du Pont de Nemours and Co. (United States, Sept. 8, '38.) 25314.

MANUFACTURE OF GLYCOLIC ACID ESTERS.—E. I. du Pont de Nemours and Co. (United States, Sept. 14, '38.) 25697.

MANUFACTURE OF QUATERNARY AMMONIUM COMPOUNDS.—E. I. du Pont de Nemours and Co. (United States, Sept. 15, '38.) 25700.

POLYMERIC COMPOUNDS SUITABLE FOR FILAMENTS, ETC.—E. I. du Pont de Nemours and Co. (United States, Sept. 15, '38.) 25701.

PRODUCTION OF ORGANIC ACIDS AND ESTERS.—E. I. du Pont de Nemours and Co., and D. J. Loder. 25538.

PRODUCTION OF NITRILES.—J. R. Geigy Akt.-Ges. (Switzerland, May 27.) 25243.

PRODUCTION OF STILBENE DYESTUFFS.—J. R. Geigy Akt.-Ges. (Switzerland, Sept. 13, '38.) 25677.

METHOD FOR FORMING A METALLIC CONNECTION through refractory vitreous material.—Hanovia, Ltd., and W. J. Sullivan. 25673.

MANUFACTURE OF STABLE PREPARATIONS OF VITAMIN E.—F. Hoffman-La Roche and Co., Akt.-Ges. (Switzerland, Oct. 10, '38.) 25464.

MANUFACTURE OF HYDROXY COMPOUNDS OF THE TERPENE SERIES.—Howards and Sons, Ltd., W. E. Huggett and H. T. Porter. 25652.

TREATMENT OF POLYMERIC MATERIALS.—Imperial Chemical Industries, Ltd. (United States, Sept. 14, '38.) 25698.

MANUFACTURE OF THIOAMIDES.—Imperial Chemical Industries, Ltd. (United States, Sept. 15, '38.) 25699.

MANUFACTURE OF UREA DERIVATIVES.—L. Mellersh-Jackson (Parke, Davis and Co.) 25666.

METALLURGICAL FURNACES.—L. B. Lindemuth. (United States, Sept. 7, '38.) 25376.

MANUFACTURE OF POZZOLANIC MATERIAL.—F. G. Mitchell and J. E. Temple. 25769.

PRODUCING PLASTIC CONTAINERS.—Monsanto Chemical Co. (United States, Sept. 16, '38.) 25366.

MANUFACTURE OF THREADED CONTAINERS.—Monsanto Chemical Co. (United States, Sept. 16, '38.) 25367.

CONTAINERS OF ORGANIC PLASTIC MATERIAL.—Monsanto Chemical Co. (United States, Sept. 30, '38.) 25368.

PROCESS FOR THE CATALYTIC CYCLISATION OF ALIPHATIC HYDROCARBONS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Holland, Sept. 15, '38.) 25223.

PREPARATION OF HYDROGEN, ETC.—P. G. M. A. Pigache. 25190.

PRODUCTION OF PASTES FROM POLYMERISED VINYL CHLORIDE.—A. Renfrew, J. W. Davison, and Imperial Chemical Industries, Ltd. 25220, 25221.

COMPLEX PHENOLIC ESTER BASES AND SALTS THEREOF.—Resinous Products and Chemical Co. (United States, Nov. 12, '38.) 25371.

MANUFACTURE OF META-OXYPHENYLETHANOLOMINE.—Society of Chemical Industry in Basle. (France, Sept. 14, '38.) (France, Sept. 1.) 25737.

MANUFACTURE OF OXYARYL-AMINOMETHYLKETONES.—Society of Chemical Industry in Basle. (France, Sept. 14, 38.) (France, Sept. 1, '38.) 25739.

TREATMENT OF GLYCERINE-CONTAINING MATERIALS.—W. J. Tennant (Armour and Co.). 25300.

PREPARATION OF RESINOUS MATERIALS.—W. J. Tennant (Dow Chemical Co.). 25468, 25469.

OIL PURIFYING SYSTEM.—Trico Products Corporation. (United States, Apr. 1.) 25342.

PLASTIC COMPOSITIONS, ETC.—Westminster Industries, Ltd., and A. G. Innes. 25343.

EXPLOSIVES.—American Cyanamid Co. (United States, Aug. 17.) 26074.

CATALYSTS AND TO CATALYTIC DECOMPOSITION and dehydrogenation processes.—C. Arnold (Standard Oil Co.). 26198.

MANUFACTURE OF GASOLINE.—C. Arnold (Standard Oil Co.). 26199.

PRODUCING SOLID PREPARATIONS OF CRESOLS, ETC.—A. Austin (Rushden), Ltd., and W. H. Elliott. 26151.

PROCESS FOR TREATING WEARING-APPAREL, ETC.—W. Bridge and Imperial Chemical Industries, Ltd. 25795.

PROCESS FOR THE SAPONIFICATION OF MARINE, ETC., WAXES.—G. H. Briggs, and H. Adams. 25937.

COPPER BASE ALLOYS.—M. Cook, W. O. Alexander, and Imperial Chemical Industries, Ltd. 26128.

APPARATUS FOR EXTRACTION OF DUST, ETC., FROM GASES.—Corinth, Ltd. (Germany, Sept. 22, '38.) 26267.

GEL STRUCTURES.—Davison Chemical Corporation. (United States, Oct. 28, '38.) 25906.

MANUFACTURE OF AMIDES.—E. I. du Pont de Nemours and Co. (United States, Sept. 17, '38.) 25798.

MANUFACTURE OF PURE COMPOUNDS of the cyclopentanopolyhydrophenanthrene series.—H. Fairbrother (Naamlooze Vennootschap Organon). 25986.

Complete Specifications Open to Public Inspection

OIL-SOLUBLE RESIN, and method of making same.—I. Rosenblum. March 2, 1938. 13596/38.

MAGNESIUM TITANATES, and methods of making same.—Titanium Alloy Manufacturing Co. March 5, 1938. 4396/38.

EXTRACT OF CELLULAR MATTER, and process of producing same.—Institutum Divi Thomae Foundation. March 2, 1938. 4796/39.

FILTERS.—Alfa Soc. Anon. Pour La Fabrication Des Pâtes de Cellulose; L. Colas, J. Colas, and A. Colas. March 1, 1938. 6643/39.

MANUFACTURE OF VAT DYESTUFFS.—Soc. of Chemical Industry in Basle. March 2, 1938. (Cognate Application, 6691/39.) 6690/39.

MANUFACTURE OF CONDENSATION PRODUCTS containing nitrogen.—Soc. of Chemical Industry in Basle. March 2, 1938. (Cognate Application 6693/39.) 6692/39.

MANUFACTURE OF SATURATED OR UNSATURATED NEOPREGNANE-3 :20-DIONES or their homologues or derivatives.—Soc. of Chemical Industry in Basle. March 2, 1938. (Cognate Application, 6695/39.) 6694/39.

MANUFACTURE OF SOLUBLE AROMATIC SULPHONAMIDE COMPOUNDS.—Winthrop Chemical Co., Inc. March 5, 1938. (Cognate Application, 6910/39.)

MANUFACTURE OF AZO-DYESTUFFS.—Soc. of Chemical Industry in Basle. March 5, 1938. (Cognate Application, 7253/39.) 7252/39.

Specifications Accepted with Date of Application

TREATMENT OF CELLULOSIC TEXTILE FIBRES AND MATERIALS, and the products resulting from such treatment.—Ridgway, Whiting, and Bodenschatz, Inc. Nov. 27, 1936. 512,236.

PREPARATION OF THERAPEUTICALLY USEFUL HETEROCYCLIC COMPOUNDS.—May and Baker, Ltd., A. J. Ewins, and M. A. Phillips. Nov. 29, 1937. 512,145.

METHOD FOR MANUFACTURING A HIGHLY ACTIVE DEPOLARISER FROM NATURAL PYROLUSITE.—Leclanche Soc. Anon. June 23, 1937. 512,179.

EMULSIFYING AND HOMOGENISING APPARATUS.—W. J. Caldwell. June 24, 1938. 512,352.

MANUFACTURE OF AZO DYESTUFFS.—Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Réunies Etablissments Kuhlmann. Aug. 20, 1937. 512,088.

DE-SULPHURISING MINERAL OILS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Aug. 16, 1937. 512,364.

METHOD OF PREPARING PERTUSSIS TOXIN AND TOXOID.—Lederle Laboratories, Inc. Aug. 19, 1937. 512,196.

ELECTROLYTIC APPARATUS for producing hydroxides of metals.—E. Munekata. Sept. 17, 1938. 512,366.

FRACTIONATION OF MIXTURES OF HYDROCARBONS or other liquids. Soc. Pour L'Exploitation des Procédés Ab-der-Halden. Dec. 13, 1937. 512,371.

CLARIFICATION OF FOULED REGENERATING BATHS used in the manufacture of regenerated cellulose from viscose.—H. G. C. Fairweather (Manville Jenckes Corporation.) Dec. 20, 1938. 512,111.

DESULPHURISING MINERAL OILS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij and J. G. Fife. Aug. 11, 1938. 512,395.

PRODUCING ISOBUTANE FROM NORMAL BUTANE.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Aug. 18, 1937. 512,408.

Weekly Prices of British Chemical Products

A GOOD demand has been put through in the general chemical market this week and steadier price conditions are noted for home produced materials. Supplies of caustic potash and carbonate of potash remain difficult, available supplies being insufficient to meet a fairly wide demand. In the coal tar market business has proceeded along steady lines with values inclined to higher levels.

MANCHESTER.—Prices on the Manchester chemical market have generally been on a steady to firm basis during the past week. The majority of the soda products are being taken up in good quantities, with little change in values, and a fair business is passing in the ammonia and magnesia compounds. Offers of most descriptions of potash materials are restricted and nominal price conditions rule. With regard to the by-products pitch is in quiet demand and about unchanged, but an active trade is reported in cresylic acid, pyridine and naphthalene and certain other sections.

GLASGOW.—Considerable difficulty has been experienced in dealing in the Scottish heavy chemical market during the last week owing to the restrictions of supplies and prices. For the most part, however, quotations are high and supplies scarce.

Price Changes*

The state of the market for general chemicals, and the practical impossibility for the moment of obtaining supplies of certain commodities, has caused the market price for such commodities to be merely nominal. In these cases the last ascertainable prices have been included in the list below and the commodities concerned have been marked with an asterisk. Our market representatives are making every effort to obtain prices, and as soon as these are known they will be included.

General Chemicals

ACETIC ACID.—Maximum prices per ton: 40% technical, 1 ton or over, £15 12s.; 10 cwt. and less than 1 ton, £16 12s.; 4 cwt. and less than 10 cwt., £17 12s.; 80% technical, 1 ton, £29 5s.; 10 cwt./1 ton, £30 5s.; 4/10 cwt., £31 5s.; 80% pure, 1 ton, £31 5s.; 10 cwt./1 ton, £32 5s.; 4/10 cwt., £33 5s.; commermercial glacial, 1 ton, £37; 10 cwt./1 ton £38; 4/10 cwt., £29; delivered buyers' premises in returnable barrels.

ACETONE.—Maximum prices per ton, 50 tons and over, £39; 10/50 tons, £39 10s.; 5/10 tons, £40; 1/5 tons, £40 10s.; single drums, £41 10s., delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each; delivered in containers of less than 45 gallons but not less than 10 gallons £10 10s. per ton in excess of maximum prices; delivered in containers less than 10 gallons each £10 10s. per ton in excess of maximum prices, plus a reasonable allowance.

*ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, **£10 7s. 6d. per ton; lump, £9 17s. 6d.**

*ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs.

AMMONIA, ANHYDROUS.—99.95%, 1s. to 2s. per lb. according to quantity in loaned cylinders, carriage paid; less for important contracts.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey galvanising £21 per ton, in casks, ex wharf. See also Salammoniac.

AMMONIUM DICHROMATE.—1s. per lb. d/d U.K.

*ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Prices nominal, f.o.b. Antwerp, subject to works acceptance.

*BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. **GLASGOW: £12 per ton.**

BLEACHING POWDER.—Spot, 35/37% £9 5s. per ton in casks, **special terms for contract. GLASGOW: £9 5s. per ton net ex store.**

BORAX COMMERCIAL.—Granulated, £18 per ton; crystal, £19; powdered, £19 10s.; extra finely powdered, £20 10s.; B.P. crystals, £27; powdered, £27 10s.; extra fine, £28 10s. per ton, in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £60; powder, £61; in tin-lined cases for home trade only, packages free, carriage paid in Great Britain.

BORIC ACID.—Commercial granulated, £32 per ton; crystal, £33; powdered, £34; extra finely powdered, £36; large flakes, £44 10s.; B.P. crystals, £41; powdered, £42; extra fine powdered, £44 per ton for ton lots, in free 1-cwt. bags, carriage paid in Great Britain.

CALCIUM BISULPHITE.—£7 5s. per ton f.o.r. London.

*CALCIUM CHLORIDE.—GLASGOW: 70/75% solid, £5 12s. 6d. per **ton ex store.**

*CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, **£7 to £9 per ton according to grade and locality.**

*CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; **£19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); $4\frac{5}{8}$d. per lb. d/d station in single 70-lb. cylinders.**

*CHROMETAN.—Crystals, 3d. per lb.; liquor, £13 per ton d/d **station in drums.**

CHROMIC ACID.—$10\frac{3}{4}$d. per lb., less $2\frac{1}{2}$%: d/d U.K.

*CHROMIC OXIDE.—$11\frac{3}{4}$d. per lb.; d/d U.K.

*CITRIC ACID.—1s. $0\frac{1}{4}$d. per lb. MANCHESTER: 1s. $0\frac{1}{4}$d. GLASGOW: **B.P. crystals, 1s. $0\frac{3}{4}$d. per lb; less 5%, ex store.**

*COPPER SULPHATE.—£18 5s. per ton, less 2% in bags. **MANCHESTER: £23 per ton f.o.b.** GLASGOW: £19 10s. **per ton, less 5%, Liverpool in casks.**

*CREAM OF TARTAR.—100%, £4 12s. per cwt., less $2\frac{1}{2}$%. GLASGOW: **99%, £4 12s. per cwt. in 5-cwt. casks.**

FORMALDEHYDE.—40% by volume, £25 to £27 per ton, according to quantity, in casks, ex store.

FORMIC ACID.—85%, £42 per ton for ton lots, ex store, in cylinders; smaller parcels quoted at 45s. 6d. to 47s. 6d. per cwt., ex store.

*GLYCERINE.—Chemically pure, double distilled, 1,260 s.g., in tins, **£3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.**

HEXAMINE.—Technical grade for commercial purposes, 1s. 4d. per lb.; free-running crystals are quoted at 1s. 7d. per lb.; carriage paid for bulk lots.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according **to purity, strength and locality.**

*IODINE.—Resublimed B.P., 7s. 9d. per lb. in 7 lb. lots.

*LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by **vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One ton lots ex works, barrels free.**

*LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. MANCHESTER: White, £38. GLASGOW: White crystals, £30; brown, £1 per ton less.

LEAD NITRATE.—About £40 per ton in casks.

LEAD, RED.—English, 5/10 cwt., £35; 10 cwt. to 1 ton, £34 15s.; 1/2 tons, £34 10s.; 2/5 tons, £34; 5/20 tons, £33 10s.; 20/100 tons, £33; over 100 tons, £32 10s. per ton, less $2\frac{1}{2}$ per cent. carriage paid; non-setting red lead, 10s. per ton dearer in each case; Continental material, £1 per ton cheaper.

LEAD, WHITE.—Dry English, less than 5 tons, £45; 5/15 tons, £41; 15/25 tons, £40 10s.; 25/50 tons, £40; 50/200 tons, £39 10s. per ton, less 5% carriage paid; Continental material £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £53; 5/10 cwt., £52; 10 cwt. to 1 ton, £51 10s.; 1/2 tons, £50; 2/5 tons, £49; 5/10 tons, £47; 10/15 tons, £46; 15/25 tons, £45 10s.; 25/50 tons, £45; 50/100 tons, £44 10s. per ton, less 5% carriage paid. Continental material £2 per ton cheaper.

LITHARGE.—10 cwt.-1 ton, £34 15s. per ton.

LITHOPONE.—Maximum prices, 28/30 per cent., £15 10s. per ton, 60 per cent., £29 per ton, delivered buyers' premises.

MAGNESITE.—Calcined, in bags, ex works, about £9 to £10 per ton.

MAGNESIUM CHLORIDE.—Solid (ex wharf), £10 per ton.

*MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

*MERCURY PRODUCTS.—Ammoniated B.P. (white precip), lump, **6s. 5d. per lb.; powder B.P., 6s. 7d.; bichloride B.P. (corros. sub.), 5s. 8d.; powder B.P., 5s. 1d.; chloride B.P. (calomel), 6s. 2d.; red oxide cryst. (red precip.), 7s. 6d.; levig, 6s. 9d.; yellow oxide B.P. 6s. 10d.; persulphate white B.P.C., 6s. 7d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. 6d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.**

*METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.: **pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities.**

*NITRIC ACID.—Spot, £25 to £30 per ton, according to strength, **quantity and destination.**

OXALIC ACID.—£48 5s. per ton for ton lots, ex wharf, in casks, smaller parcels, 53s. to 57s. per cwt., ex store; deliveries slow.

*PARAFFIN WAX.—GLASGOW: $3\frac{3}{4}$d. per lb.

*POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to **quantity, ex store; broken, £40 per ton. MANCHESTER: £47.**

POTASSIUM CHLORATE.—Imported powder and crystals, ex store London, 10d. to 1s. per lb.

*POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. GLASGOW: 5½d. per lb., net, carriage paid.
POTASSIUM CHROMATE.—2s. per lb. d/d U.K.
*POTASSIUM IODIDE.—B.P. 7s. per lb. in 7 lb. lots.
POTASSIUM NITRATE.—Small granular crystals, £26 to £29 per ton ex store, according to quantity.
POTASSIUM PERMANGANATE.—Commercial, about 10¾d. per lb., delivered.
POTASSIUM PRUSSIATE.—Yellow, market nominal, supplies scarce. MANCHESTER: Yellow, 8¾d. to 9¼d. per lb.
SALAMMONIAC.—Dog-tooth crystals, £40 per ton; medium, £39; fine white crystals, £20; in casks, ex store.
*SALT CAKE.—Unground, spot, £3 8s. 6d. per ton.
SODA ASH.—Light 98/100%, £5 17s. 6d. per ton f.o.r. in bags.
*SODA, CAUSTIC.—Solid, 76/77° spot, £13 10s. per ton d/d station.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£25 to £26 per ton, ex wharf.
SODIUM BICARBONATE.—About £10 10s. per ton, in bags.
*SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.
SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.
SODIUM CHLORATE.—£27 10s. to £32 per ton, d/d according to quantity.
*SODIUM DICHROMATE.—Crystals cake and powder 4¼d. per lb net d/d U.K. with rebates for contracts. GLASGOW: 4¼d. per lb., carriage paid.
*SODIUM CHROMATE.—5d. per lb. d/d U.K.
*SODIUM HYPOSULPHITE.—Pea crystals, £15 15s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.
*SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags
SODIUM NITRATE.—Refined, £8 5s. per ton for 6-ton lots d/d GLASGOW: £1 12s. per cwt. in 1-cwt. kegs, net, ex store.
SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.
*SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.
*SODIUM PRUSSIATE.—4d. per lb. for ton lots. MANCHESTER: 4½d. to 5d. GLASGOW: 4d.
SODIUM SILICATE.—£8 2s. 6d. per ton.
*SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
*SODIUM SULPHATE (SALT CAKE).—Unground spot. £3 to £3 10s. per ton d/d station in bulk. MANCHESTER: £3 15s.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.
*SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.
*SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
*TARTARIC ACID.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1½d. per lb., 5%, ex store.
ZINC OXIDE.—Maximum prices: White seal, £23 10s. per ton; red seal, £19 10s.; green seal, £22 10s. d/d buyers' premises.
*ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2-cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 8d. to 1s. 4d. per lb., according to quality. Crimson, 1s. 8½d. to 1s. 9½d. per lb.
ARSENIC SULPHIDE.—Yellow, 1s. 6d. to 1s. 8d. per lb.
CARBON DISULPHIDE.—£38 to £41 per ton, according to quantity, drums extra.
CARBON TETRACHLORIDE.—£48 to £53 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 1s. 3d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4¼d. to 5d. per lb.; dark 3¾d. to 4¾d. per lb.
SULPHUR CHLORIDE.—6d. to 8d. per lb., according to quantity.
VEGETABLE BLACK.—£35 per ton upwards; 28/30%, £15 10s. 0d.; 60%, £29, delivered buyers' premises.
ZINC SULPHIDE.—£56 per ton ex works.
Plus 5% War Charge.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1940: September, £7 5s.; October, £7 6s. 6d.; November, £7 8s.; December, £7 9s. 6d.; January, 1940; £7 11s., February £7 12s. 6d.; March/June, £7 14s.
CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1940; September £8 2s. 6d.; October £8 3s. 9d.; November £8 5s.; December, £8 6s. 3d.; January, 1940, £8 7s. 6d.; February £8 8s. 9d.; March £8 10s.; April/June, £8 11s. 3d.
NITRO-CHALK.—£7 10s. 6d. per ton up to June 30, 1940.
SODIUM NITRATE.—£8 5s. per ton for delivery up to June 30, 1940.
CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

*BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9. MANCHESTER: Crude, 1s. 0¼d. to 1s. 0½d. per gal.; pure, 1s. 8d. to 1s. 8½d. per gal.; motor grade 1s. 6½d.
*CARBOLIC ACID.—Crystals, 9d. per lb.; Crude, 60's, 3s. to 3s. 3d., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 9d. to 3s per gal. American duty free, 2s. 9d. to 3s. f.o.b.
*CREOSOTE.—Home trade, 3¾d. to 4d per gal., f.o.r., makers' works; exports 6d. to 6¼d. per gal., according to grade. MANCHESTER: 3¾d. to 5d.
*CRESYLIC ACID.—98/100%, 2s. 9d. to 3s. per gal., according to specification. MANCHESTER: Pale, 99/100%, 2s. 10d.
*NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. MANCHESTER: 90/160%, 1s. 6d. to 1s. 7½d. per gal.
*NAPHTHALENE.—Crude, whizzed or hot pressed, £6 to £6 10s. per ton; purified crystals, £9 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. MANCHESTER: Refined, £17.
*PITCH.—Medium, soft, 35s. per ton, f.o.b. MANCHESTER: 27s. 6d. f.o.b. East Coast.
*PYRIDINE.—90/140%, 17s. 6d. per gal.; 90/160%, 15s.; 90/180%, 3s. to 4s. per gal. f.o.b. MANCHESTER: 13s. 6d. to 17s. per gallon.
*TOLUOL.—90%, 2s. 1d. to 2s. 2d. per gal.; pure 2s. 6d. to 2s. 7d. MANCHESTER: Pure, 2s. 7d. per gallon, naked.
*XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. MANCHESTER: 2s. 6d. per gallon.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £7 5s. to £8 per ton; grey, £9 to £11. MANCHESTER: Grey, £14.
METHYL ACETONE.—40.50%, £35 to £38 per ton.
WOOD CREOSOTE.—Unrefined, 8d. to 1s. per gal., according to boiling range
WOOD NAPHTHA, MISCIBLE.—3s. 3d. to 3s. 8d. per gal.; solvent, 3s. 4d. to 3s. 9d. per gal.
WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—1s. 10d. per lb., for cwt. lots, net packages.
BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.
BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11d. per lb. d/d buyer's works.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-CRESOL 30/31° C.—6¼d. to 7¼d. per lb. in 1-ton lots.
p-CRESOL 34/35° C.— 1s. 7d. to 1s. 8d. per lb. in ton lots.
DICHLORANILINE.—2s. 1½d. to 2s 5½d. per lb.
DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.
DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.
DIPHENYLAMINE.—Spot, 2s. 3d. per lb.; d/d buyer's works.
GAMMA ACID, Spot, 4s. 4½d. per lb. 100%, d/d buyer's works.
H ACID.—Spot, 2s. 7d. per lb.; 100%, d/d buyer's works.
NAPHTHIONIC ACID.—1s. 10d. per lb.
β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.
α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.
β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.
NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.
o-NITRANILINE.—4s. 3½d. per lb.
m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 10d. to 1s. 11d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.
NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.
SULPHANILIC ACID.—Spot, 8¾d. per lb. 100%, d/d buyer's works.
o-TOLUIDINE.—10½d. per lb., in 8/10 cwt. drums, drums extra.
p-TOLUIDINE.—1s. 10½d. per lb., in casks.
m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices

LONDON.—Oct. 11.—OILS.—There was a fair demand for non-controlled commodities, where supplies were available. Rosin was nominal at around 35s. per cwt., no grade specified. Turpentine was offered at the unchanged rate of 75s. per cwt., spot, American, including tax, ex wharf, barrels, and ex discount. Paraffin scale, nominally 37s. per cwt. (122-124 per cent.), ex wharf.
HULL.—In oils allocations were being made on the basis of prices issued by the Ministry last evening, to operate until Oct. 28.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

HINCKLEY DYE WORKS, LTD. (M., 7/10/39.) Sept. 26, £1,000 (not ex.) mortgage to Lloyds Bank, Ltd., charged on land and factory at Ashby Road and Netherley Road, Hinckley.

XELEX PRODUCTS, LTD., London, W., manufacturers and dealers in raw plastic material. (M., 7/10/39.) Sept. 22, series of £6,000 debentures, present issue £2,500; general charge.

Companies Winding Up

LIGHTPLASTICS, LTD. Sept. 20. (C.W.U.V., 7/10/39.) R. H. Porter, 90 (Gresham House, 24 Old Broad Street, E.C., liquidator.

Company News

The Eaglescliffe Chemical Co. announce an interim dividend of $2\frac{1}{2}$ per cent.

The British Xylonite Co., Ltd., have resumed the payment of dividend of $7\frac{1}{2}$ per cent., less tax ($6\frac{2}{3}$ per cent.).

Newton, Chambers and Co., Ltd., have declared an interim dividend of five per cent. (same), payable on October 18.

The British Xylonite Co., Ltd., have resumed the payment of interim dividends with a distribution of $2\frac{1}{2}$ per cent., less tax.

Nitrogen Fertilisers, Ltd., have increased their nominal capital by the addition of £390,000, in £1 ordinary shares, beyond the registered capital of £10,000.

Bowater's Paper Mills announce that the payment of dividend on the $7\frac{1}{2}$ per cent. cumulative participating preference stock for the half-year ending September 30 has been deferred.

Lawes Chemical Co., Ltd., report a profit for the year to June 30, 1939, of £12,561 (against £12,434); preference dividend seven per cent. (same); ordinary dividend six per cent. (same); to doubtful debts reserve, £1,000 (£1,000 to depreciation reserve); to general reserve, £1,235 (£1,606); forward, £1,888 (£1,805).

The Manganese Bronze and Brass Co., Ltd., have declared an interim dividend of 25 per cent. on ordinary shares and $4\frac{1}{2}$ per cent. on "A" preference shares, both subject to tax at 7s. (same), payable on October 21.

The British Oxygen Co. are maintaining their interim dividend at 7 per cent. for the current calendar year, less tax at 7s. in the £1. In each of the two previous years the final dividend has been 10 per cent., making 17 per cent. for the year. Warrants will be posted on October 31 to holders registered on September 28.

Aspro, Ltd., report net profits for the year ended June 30 last of £264,910; brought forward £11,831. The directors have made the following appropriations: To taxation reserve £95,000, to general reserve £50,000, to dividend equalisation reserve £10,000. A final dividend on the ordinary stock of 15 per cent. is recommended, making 25 per cent. for the year (same), leaving to be carried forward £11,178.

New Companies Registered

Stickland and Co. (Chemists), Ltd.—Private company. Capital, £5,000 in £1 shares. To carry on the business of manufacturing, wholesale, retail, consulting, research, analytical and dispensing chemists and druggists, etc. Permanent directors: Andrew R. Melhuish, 152 Clarence Gate Gardens, Regents Park, N.W.1; Bernard R. Wilkinson.

Bye-Products Recovery, Ltd. (356,782).—Private company. Capital, £2,000 in 2,000 shares of £1 each. To carry on the business of distillers, refiners, blenders and manufacturers of and dealers in acid residues and other products resulting from the carbonisation of coal and other carbonaceous substances; chemicals and chemical products, etc. Directors: Gwynne Cellan-Jones, Oakwood, The Avenue, Linthorpe, Middlesbrough, engineer; C. Norman Sadler, Cecil J. Cellan-Jones, Herbert W. Pescod.

Grimsby Cod Liver Oils, Ltd.—Private company. Capital, £20,000 in 20,000 shares of £1 each. To acquire the undertaking of Grimsby Cod Liver Oils, Ltd. (incorporated 1936), and to carry on the business of manufacturers, crushers, extractors (by chemical process or otherwise), producers and distillers of and dealers in oils, etc. Directors: Joseph G. Little, Humberstone Court, New Waltham, Grimsby, trawler owner; Joseph R. Cobley, M. Cullum, Harry M. Cook, Albert W. Butt, Herbert W. Crampin, Chas. Taylor, Bill Butt.

Manure Contractors (Birmingham), Ltd. (356,521).—Private company. Capital: £100 in 100 shares of £1 each. Objects: To enter into contracts for the sale and purchase of and to distribute, vend and purchase all kinds of manure, fish, chemical and other fertilisers, to manufacture and deal in all other products arising out of or used in connection with such manure or fertilisers, etc. Directors are: Arthur L. Duce, 28 Larmans Road, Enfield, Middlesex, and Frederick J. Lanes. Solicitor: Jas. H. Fellowes, 26 Theobalds Road, Bedford Row, W.C.1. Registered office: 28 Larmans Road, Enfield, Middlesex.

Chemical and Allied Stocks and Shares

ALTHOUGH little, if any, improvement in the volume of business was reported, firmer conditions have prevailed in the industrial section of the Stock Exchange. Sentiment was aided by the better undertone of the gilt-edged market, and also by the growing belief that in many cases industrial securities would appear to have been reduced to levels which more than discount the higher taxation and increased costs that have to be faced as a result of war conditions.

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Imperial Chemical were "ex" the interim dividend, and at 28s. $1\frac{1}{2}$d. had a relatively steady appearance, while Distillers at 85s. 6d. were also well maintained and continued to be held firmly because the price still carries the share bonus. B. Laporte were inactive and were again quoted around 56s. 3d., while Fison Packard also had an inactive appearance, the disposition being to await the forthcoming final dividend announcement. Swedish Match declined further from 17s. 9d. to 15s. $7\frac{1}{2}$d., but Lever and Unilever at 28s. 9d. were little changed on balance. Monsanto Chemicals $5\frac{1}{2}$ per cent. preference were slightly lower and showed a fair amount of business around par. United Premier Oil and Cake were unchanged at 6s. $1\frac{1}{2}$d. pending the interim dividend announcement. Imperial Smelting remained around 10s. following the results, while Wall Paper Manufacturers' deferred units kept at 20s. The preliminary figures for the past year's working are expected to be issued by the last-named company this month.

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Pinchin Johnson improved to 18s. and International Paint were better at 75s., but slightly lower prices were made by Indestructible Paint and Blythe Colour Works. United Molasses and Borax Consolidated were lower at 25s. and 23s. 9d. respectively, but Barry and Staines and Michael Nairn moved in favour of holders. Cerebos improved on the assumption that the interim dividend is likely to be maintained. Iron and steel securities showed few movements of importance, sentiment having been affected by the belief that the incidence of the Excess Profits Tax will prevent more than a moderate rise in net profits, despite the great activity in the heavy industries. Tube Investments were around 76s. $10\frac{1}{2}$d., aided by continued hopes that the payment for the financial year may be maintained, while Guest Keen at 20s. 6d. were firmer. The interim dividend of the last-named company falls to be declared early next month. Staveley were firm at 40s. 9d., as were Stewarts and Lloyds at 40s. 6d., while Richard Thomas preference made the slightly improved price of 11s. 3d. British Plaster Board were 21s., and Associated Cement 65s. Dunlop Rubber fluctuated around 24s. 6d., pending the interim progress report, which the market expects is likely to be issued shortly.

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Among textile securities Bradford Dyers and Bleachers were slightly better. Courtaulds were lower at 25s. 6d., but British Celanese issues were inclined to have a firmer appearance, having remained under the influence of the payment on account of preference dividend arrears. Elsewhere, Boots Drug were 37s. 6d., and, aided by the maintenance of the interim dividend at $7\frac{1}{2}$ per cent., Timothy Whites subsequently recovered to 21s., while Sangers were 20s. Beechams Pills deferred were around 7s. $4\frac{1}{2}$d., William Blythe were 5s. 9d., and Low Temperature Carbonisation 1s. 9d. Among oil shares "Shell" and Royal Dutch were moderately lower in sympathy with many securities with an international market, but on balance Anglo-Iranian improved from 56s. 3d. to 58s. $1\frac{1}{2}$d., awaiting the interim dividend announcement. Trinidad Leaseholds were well maintained, while at 61s. 3d. Burmah Oil were also the same as a week ago.